

Indian Science Directory: NCI Current Contents

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We have to organize our resources, generate database and make information available to all the 3.4 million S & T personnel and orient need-based R & D to improve on the existing products in the market.

As on date there are a few established ways to transfer information. The speech, the handwritten, and the print, in that order, have evolved over a period of time¹. The speech form is not verifiable, handwritten cannot be reproduced for mass dissemination and the print form is not versatile. Currently, information, while in the electronic form, can be transacted with great speed and accuracy. Unlike the print form it is not static but versatile. It can now be maneuvered by user-friendly computer commands.

Availability of this infrastructure for over two decades in the developed countries has led to storage and supply of large volumes of information in electronic form. India does not have a powerful database industry like developed countries. *Indian Science Directory (ISD)* has appeared on the scene and is striving to supply information on published Indian scientific literature. There are several directories published in the country. *ISD*, however is the first directory on Indian science. Parallel to *ISD*, access to information in other areas too, is required to be developed, to achieve an overall socio-economic progress.

The objective of this article is: (a) to state a need to evolve Indian database industry; (b) to draw attention to the potential market size of this industry; (c) to present a concise report on *ISD* which serves as an example of a pioneering movement in the development of Indian database industry.

Indian database industry for global presence

Globally, a common man looks for products and services that increase affluence and or the quality of life. Eightyone percent of the 3.4 million Indian S & T personnel are economically active^{2,3}. A 1990 data shows that 4.50 per 1000 population in India are scientists, engineers and technicians (SET). Of this 4.50/1000, only 0.27/1000 are in R & D⁴, which means that 6% of the total SET are in active research. Thus the remaining 94% of SET could be self-employed, or engaged in

administration and planning either in private⁵ or in public sector organizations, with or without business administration qualifications. Thus we have a strong technical manpower, strong business sense and large market opportunity². We should concentrate on small projects⁶ with self-reliant methods (technology) to improve upon the existing and time-tested products. It is essential today to bail ourselves out of the misplaced emphasis on basic science if we have to survive as an independent nation⁷. Technology moves ahead with whatever information it has – from science, craft, testing, intuition, experience and computation⁸ and our research & development needs to have concrete linkages with local resources².

In developed and industrialized countries there is greater access to resources^{9,10} and we aid these countries with our S & T personnel¹¹. Fifteen years ago Taiwan gave very high priority to database industry by linking computers and telecommunications¹². Information is wealth. Rapid (through online) and wide (telecommunication network) access to information is power¹⁴. We therefore have to first gather this wealth and later distribute it, to our technical personnel rapidly and widely. Our future prosperity depends upon efforts in making available good amount of information in the electronic form, particularly to business community, scientists, policy makers and the like, through networks. We create resources database on computers and supply information which: a) is viable in our working environment, b) meets immediate needs, c) can be interpreted and implemented, d) matches with our experience and, e) should not compromise our present and past wisdom. In short, information which is supplied has to be well organized, self-explanatory, user-friendly and motivate to act upon the local information.

The sum total of all our efforts put together in science, technology and business astuteness should target towards achieving a global presence of our products that speaks of our talent and innovation, both in science and commerce. To top it, we demonstrate that this is possible by managing our own resources.

Information market

In 1986, the online revenue was \$ 3.0 billion with 12

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lakhs users. This revenue has steadily grown, by the end of 1993, to \$ 12.10 billion with 49 lakhs users. By 1996 it is projected to reach \$ 19.0 billion with 78 million users¹³. The revenue on S & T of \$ 0.75 billion in 1989 has increased to \$ 1.15 billion in 1993. In 1994 it is estimated to reach \$ 1.13 billion¹³.

Proposed Indian databases

It is a practice in USA to have more information, particularly in a discipline not close to the main subject¹⁴, because every subject calls upon ideas from many different disciplines¹⁵. Online information to reach the user requires a computer, modem and a telephone (CMT) on the desk. In addition to CMT, two other things are also required. They are (a) distribution networks and (b) actual information from the databases. Having a CMT is not too expensive. We have made considerable progress in networking, but not in production of databases³. There is therefore a need to develop resource-sharing databases¹⁶, raw material inventory database to restrict exploitation⁷ and in fact databases on all steps from ideation to product launch to product monitoring in the market. The knowledge databases which offer critical appraisal of resources are certainly required² for they support various factors of industrial production. Databases on subjects like, 1) statistics; 2) natural products; 3) chemistry; 4) medicinal and aromatic plants; 5) traditional system of medicine; 6) leather technology; 7) textiles, have been recommended for their generation and development since they are identified as strength areas³. However, considering the chain of information inputs that are required to manufacture a product and put it in the market, more informative databases are required to be consulted. The additional ones are: 8) capture of thoughts and storing in and as idea banks; 9) raw material; 10) equipment; 11) skilled man power; 12) methods/procedures/technology; 13) customer needs; 14) published literature; 15) Ph D thesis; 16) patents; 17) land information; 18) utilities – water and electricity; 19) quality standards; 20) products; 21) financial services; 22) trade marks; 23) legal – act/laws; 24) Market; and 25) Vedic literature.

The list is not complete. It has also been reported³ that the machine tool database covers the subject at much more depth than any global database. A few such in other areas are also available¹⁰. Information on some of the above areas is available in the print form. Presently, information access, collation and building into a meaningful action-oriented communication are difficult and cumbersome. Information in the print form is usually produced by DTP. It could be considered for online access. Still, a lot of improvement in the areas of gathering, classifying, building of codes, standardizing,

and maintaining of resources is required for consolidation of the database industry. Surely, ample tolerance and organizing capabilities have to be demonstrated by those who attempt to enter database industry. With this backdrop, an enterprise has already made the beginning to develop the *ISD* database of published Indian scientific literature – (Item 14 above). *ISD* could probably serve as another Indian model and near-at-hand experience for the development of other resources databases in India.

Indian Science Directory

A pressure has been felt as to how to spread the culture of very good science that exists in a few places to the nooks and corners of the country¹¹ and initiate a pioneering movement nurtured by Indian scientists to raise the standards of Indian scientific journals¹⁷.

Directories, yellow pages and guides covering various disciplines of trade and commerce are available in India. However, a comprehensive, popular and widely circulated directory on Indian scientific activity is not available in our country. In view of this, an *Indian Science Directory (ISD)* was conceived and developed into *NCI Current Contents*.

Out of the total 1991 Indian S & T periodicals appearing in INSDOC directory, 1052 have been¹ selected. These are English-language journals containing review/original/informative articles of technical or research topics. Most of them have a place in *Indian Science Abstracts*, published from INSDOC. A few of them are covered by international indexing periodicals like *Biological Abstracts*, *Chemical Abstracts*, *Physical Abstracts*, *Current Contents* and *Science Citation Index*.

The *ISD* enterprise started in September 1992 as a simulation exercise with few Indian journals. Presently 85 publications are included in *ISD*. After scanning the table of contents of these publications, *ISD* provides information in both print and electronic form on a monthly basis. *ISD* also provides the address of the journal. The information provided in *ISD* is sufficient for the reader to obtain a full text article. Encouragement is on record from UNDP, BARC, IIT, ISRO, INSDOC, from the public sector undertaking and Reliance, Lyka, Fulford, Burroughs Wellcome, Cyanamid, Roussel, Merind and Wockhardt from the private sector for the worth of *ISD* enterprise. The online version of *ISD* is on Bombay Library Network (BONET), coordinated by the National Centre for Software Technology (NCST), Bombay.

There is another area where *ISD* has made progress. This enterprise has developed *ISD* codes for all the selected 1052 journals which will serve easy online retrieval of scientific data. The directory published by

GENERAL ARTICLE

Table 1. Indian science and technology periodicals

Code*	Periodicals and their attributes**	Code*	Periodicals and their attributes**
ST01	<i>Current Science</i> 2,3,5,6,7,8	ST37	<i>Journal of Scientific & Industrial Research</i> 2,3,5,6,7.
ST02	<i>Indian Journal of History of Science</i> 2,3,4,6,7.	ST38	<i>Journal of Scientific Research of BHU</i> 1,2,5,6,7
ST03	<i>Proceedings of Indian Natl. Sci. Academy Physical Sciences</i> 1,2,5,8,9.	ST39	<i>Journal of Society for Pure and Applied Natural Sciences</i> 2,3,5,6.
ST04	<i>Bulletin of Sciences Journal of Science Technology & Society</i> 3,4,7.	ST40	<i>Journal of Andaman Science Association</i> 2,5,7.
ST05	<i>Himalayan Research & Development</i> 1,2,3,5,6	ST41	<i>Journal of Asiatic Society</i> 3,5,6,7.
ST06	<i>International Journal of Science and Engineering</i> 2,3,5,6.	ST42	<i>Journal of The Madras University - Sec. B. Math. Phys and Biol. Sci.</i> 2,5,6
ST07	<i>Journal of the Indian Institute of Science</i> 2,5,6,7.	ST43	<i>Journal of the Maharaja Sayajirao University of Baroda</i> 2,3,5,6,7.
ST08	<i>Journal of Recent Advances in Applied Sciences</i> 1,2,3,5,6,7,8,9	ST44	<i>Journal of Shivaji University - Science</i> 2,5,6
ST09	<i>Journal of Scientific Research</i> 2,5,6,7,8,9,10,12.	ST45	<i>Journal of University of Bombay - Science</i> 2,5,6.
ST10	<i>MAAS Journal of Islamic Science</i> 1,2,3,5,6,7.	ST46	<i>Journal of University of Poona</i> 2,3,5,7.
ST11	<i>PTI Science Service</i> 3,4,7.	ST47	<i>Mapcost Sted Newsletter</i> 3,4.
ST12	<i>Research & Industry</i> 2,3,5,6,7.	ST48	<i>Marathwada University Journal of Science - Natural Science</i> 2,3,5,7,8.
ST13	<i>Research Bulletin of Punjab University - Science</i> 2,5,6,7.	ST49	<i>National Academy of Sciences Letters</i> 2,5,6,7.
ST14	<i>Sci. Tech Focus</i> 1,3,4	ST50	<i>National Physical Laboratory Technical Bulletin</i> 3,4.
ST15	<i>Proceedings of Indian Science Congress Association Part I</i> 3,7.	ST51	<i>North Bengal University Review Science & Technology</i> 2,3,5.
ST16	<i>Proceedings of Indian Science Congress Association Part II</i> 3,6.	ST52	<i>Patrika</i> 3,4.
ST17	<i>Burdwan University Journal of Science</i> 3,5.	ST53	<i>Popular Science and Technology</i> 3,7.
ST18	<i>Defense Science Journal</i> 2,3,5,6,7.	ST54	<i>PPST Bulletin</i> 2,3,4,7.
ST19	<i>Desidoc Bulletin</i> 2,4,7.	ST55	<i>Prakruti Utkal University Journal Science</i> 2,5,6.
ST20	<i>Everyman's Science</i> 3,7.	ST56	<i>R & D Digest</i> 3.
ST21	<i>Fusion Asia</i> 1,3,4,7.	ST57	<i>Research Journal Faculty of Science, Kashmir University</i> 2,3,5.
ST22	<i>Indian Journal of Physical and Natural Science - Sec A</i> 5,6,7,9,10.	ST58	<i>Science and Culture</i> 1,2,5,6,7.
ST23	<i>Indian Journal of Physical and Natural Science - Sec B</i> 2,4,6,7.	ST59	<i>Science Reporter</i> 5,7.
ST24	<i>Indian Journal of Regional Science</i> 2,3,5,6,7.	ST60	<i>Science Review</i> 1,2,5.
ST25	<i>Indian Science Cruiser</i> 3,4.	ST61	<i>Science Technology and Development</i> 1,2,5,7.
ST26	<i>Jista Journal of the Indian Scientific Translators Assn</i> 2,3,4,7.	ST62	<i>Seminar Reporteur</i> 3,4.
ST27	<i>Jnanabha</i> 1,5,7.	ST63	<i>Sri Krishnadevaraya University Research Journal</i> 1,2,3,5.
ST28	<i>Journal Mendel</i> 1,5,6,7,8,9,10.	ST64	<i>Times of Science and Technology</i> 2,3,5.
ST29	<i>Journal of Annamalai University - Part C Engrn and Tech.</i> 2,3,5,6.	ST65	<i>Transactions of Bose Institute</i> 2,5,6,7.
ST30	<i>Journal of Assam Science Society</i> 2,5,6,7.	ST66	<i>University of Udaipur Research Journal</i> 2,3,9.
ST31	<i>Journal of Biological and Chemical Research</i> 1,2,5,7,8.	ST67	<i>Venture India</i> 3,4.
ST32	<i>Journal of Hill Research</i> 1,2,5,7	ST68	<i>Vidya Part B Sciences</i> 2,5,6,7,10
ST33	<i>Journal of Jwaji University Science Technology & Medicine</i> 2,3,5,6,8.	ST69	<i>Vignana Bharathi</i> 1,2,5,7.
ST34	<i>Journal of Karnatak - Science</i> 1,2,3,5,6,7.	ST70	<i>Vigyan Scientific American Indian Edition</i> 3,12.
ST35	<i>Journal of Natural and Physical Sciences</i> 1,2,5,6,7.	ST71	<i>Vikram</i> 2,5,6,7,9,10.
ST36	<i>Journal of Ravishankar University</i> 1,2,5.	ST72	<i>World Science News</i> 3,7.
		ST73	<i>World Trade Review</i> 3,4,6.

*ST = Science & Technology.

**1 = Review article; 2 = Original article, 3 = Informative article; 4 = Technical; 5 = Research; 6 = Indian Science Abstract, 7 = International Standard Serial Number; 8 = Current Contents; 9 = Biological Abstracts; 10 = Chemical Abstracts, 12 = Physical Abstracts.

INSDOC has organized the journals according to the UDC (Universal Decimal Classification) number. Accordingly there are 47 subject areas. In the area of science and technology there are 132 publications. Inclusion of publications into *ISD* is satisfied by 73 science and technology publications. *ISD* codes for these 73 journals, their name and nature of information appearing in these journals are given in Table 1. It may be pointed out that INSDOC directory does not provide user friendly codes for individual publications. *ISD* codes of other journals will appear elsewhere in respective and relevant publications.

The aspiration of all our research - basic or applied - is to serve the needs of an ordinary man. Business and trade is being revolutionized by science and methodology. Our future depends on how fast we understand this and

how fast we can adapt to changes in our day-to-day working. If we are in business we have to produce a product or provide a service that has strength which is viable for trade. We therefore, have to do it better, and make it better. If we cannot improve, we cannot compete with those who do it. Lack or delay in obtaining information therefore leads to loss of business. We decide our markets and our economy and accept and settle with what we deserve.

To conclude, we have to organize our resources, generate database and make information available to all the 3.4 million S & T personnel and orient need-based R & D to improve on the existing products in the market. Except for the information in the electronic form, we have the other infrastructure with us, as pointed out by other eminent authors.

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